PATENT SPECIFICATION (11) 1 352 626

1352626

(21) Application No. 49479/71 (22) Filed 25 Oct. 1971
(31) Convention Application No. 15503 (32) Filed 16 Nov. 1970 in
(33) Sweden (SW)
(44) Complete Specification published 8 May 1974
(51) International Classification F24F 13/06
(52) Index at acceptance
F4V A1E A1F A2B

(19)

(54) APPARATUS FOR SUPPLYING LARGE VOLUMES OF AIR

(71) We, AKTIEBOLAGET SVENSKA FLAKTFABRIKEN, of Sickla Alle 1, 131 00 Nacka, Sweden, a Swedish company, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to apparatus for supplying large volumes of air, for example to rooms having very large dimensions of length, width and height such as indoor sports fields, or to rooms including combustion furnaces and equipment for other industrial processes with a very high air consumption.

The ventilation of indoor sports fields and similar large public places in which thousands of people or spectators are situated for a long period of time is difficult to control.

Thus, a demand for volumes of air up to 500,000 m^3/h is not unusual particularly when considering the exceptionally large dimensions of such places in relation to their roof height. Moreover, it is often necessary to have only a relatively small temperature difference, of the magnitude 10°C, between the inside air and the air supplied. In the case of a large room housing a skating rink, there is also the problem that the air must be supplied as a jet with a large length of throw beyond the centre of the rink in order to prevent the supply air, which is usually warmer, from impinging on the ice surface and causing part of it to melt.

An additional requirement usually to be met by apparatus for the supply of large volumes of air is a reasonably low sound level, for example of the magnitude NC≃30.

According to the invention there is provided apparatus for supplying large volumes of air to a room comprising a nozzle in the form of a pipe which is perforated at one portion there being a piston within the perforated portion adapted to be adjusted in position longitudinally of the pipe so that by changing the area of the perforated portion the volume of air flow from an airway passageway through the perforated portion and out of a second portion of the pipe is controlled, the second portion terminating in a conical end portion converging in the flow direction of the air and through which the air exits.

In a preferred embodiment, the second portion of the pipe may be surrounded by a non-perforated pipe socket. The non-perforated pipe socket may thus constitute the second portion of the pipe and extend outside of the wall surface and project into the room.

The conical portion may be rotatable about the longitudinal axis of the pipe and/or may be pivoted about an axle perpendicular to the longitudinal axis and connected to the non-perforated pipe socket for changing the direction and length of throw of the air at its ejection from the nozzle.

Three embodiments of the invention are diagrammatically illustrated, by way of example, in the accompanying drawings, in which:—

Figures 1, 2 and 3 show respective longitudinal cross-sections of three embodiments of apparatus installed in a room.

Referring to the drawings, in which like reference numerals denote like features, there is shown a room 1 into which a large volume of air is to be injected at a relatively great height above the floor or ground by means of a number of nozzles and having a wall 2, for example one of the shorter walls in the room transverse to the length thereof. In cases when the air volume amounts to in the order of 500,000 m^3/h about one hundred nozzles 3 are required.

Each nozzle 3 comprises a pipe 5 which projects into an air supply passageway 4 disposed immediately behind or in front of the wall 2. The air supply passageways may be built-in behind the wall 2 or constructed as hollow pillars placed, for example, adjacent corners between the short and long walls of the room, each pillar carrying at its top a great number of nozzles directed to the room. A portion 6 of the pipe 5 projecting into

the passageway 4 is perforated. Within the perforated first or rear portion 6 there is a piston 7 which can reciprocate within the portion 6 of the pipe 5 in relation to the wall 2 so that the length of the perforated portion 6 can be controlled to control the volume, and air flow, of the pipe 5. The piston has a rod 7a, and the direction of motion of the rod is indicated by arrows 8. A second or forward end portion of the pipe 5 passing through an opening in the wall is provided with a conical portion 10 open to the room 1.

In one example each pipe 5 has a length of about 2 m and a diameter of about 0.7 m.

The open conical portion 10 projecting into the room 1 may be provided with a number of concentric inserts of the kind described in Applicant's previous Swedish patent specification No. 207,669. The opening in the conical portion 10 may be covered by a wire-net to prevent ingress of foreign bodies.

The forward portion of the pipe 5, as shown in Figures 1 and 2, may be surrounded by a non-perforated separate pipe socket 9, or the two parts 5 and 9 may be integral as shown in Figure 3. The conical portion 10 shown in Figures 1 and 2 is rotatable about the longitudinal axis of the pipe 5 and/or is pivoted about an axle 11 perpendicular to the longitudinal axis and is connected to the non-perforated pipe socket 9 for changing the direction of the supply air and its length of throw from the nozzle.

The conical portion 10 is rotatable about the axle 11 to a position in which the rear edge line of the conical portion is indicated by a dashed line in the drawings. As can be seen in Figures 1 and 2, the conical portion is so inserted in the pipe socket 9 that an annular gap is formed for the air, which is thereby supplied both centrally through the cone mouth and as an annulus along the boundary surface of the cone. The embodiment shown in Figure 3 comprises a conical portion 10a mounted externally of the pipe socket 9.

We have also found that by utilizing the adjustable piston 7 for screening off a relatively large perforated flow area, the control of the air flow can be made substantially noiseless compared with conventional dampers, which often produce a hissing sound particularly in connection with downward adjustment of small air flows. The piston 7 also cleans the perforated pipe on its perforated inside, to which access is difficult.

It will be apparent that the large number of nozzles utilized results in the supply of a large volume of air which is spread over the room.

WHAT WE CLAIM IS:—

1. Apparatus for supplying large volumes of air to a room comprising a nozzle in the form of a pipe which is perforated at one portion, there being a piston within the perforated portion adapted to be adjusted in position longitudinally of the pipe so that by changing the area of the perforated portion the volume of air flow from an air passageway through the perforated portion of the pipe and out of a second portion of the pipe is controlled, the second portion terminating in a conical end portion converging in the flow direction of the air and through which the air exits.

2. Apparatus according to Claim 1, in which the second portion of pipe is surrounded by a non-perforated pipe socket.

3. Apparatus according to Claim 2, in which the non-perforated pipe socket is integral with the second portion of pipe.

4. Apparatus according to Claim 2, or Claim 3, in which the conical end portion is rotatable about the longitudinal axis of the pipe and/or pivoted about an axle perpendicular to the longitudinal axis and is connected to the non-perforated pipe socket for changing the direction and length of throw of the air at its ejection from the nozzle.

5. A room of large dimensions supplied with large volumes of air, comprising a plurality of nozzles according to any one of the preceding claims, the nozzles being mounted in or adjacent at least one of the walls of the room, the perforated portion of each nozzle being in communication with one or more air supply passageways disposed in or adjacent the wall, the conical end portion projecting into the room.

6. Apparatus for supplying large volumes of air to a room, substantially as hereinbefore described and illustrated in the accompanying drawings.

EDWARD EVANS & CO.,
53—64 Chancery Lane,
London, WC2A 1SD.
Agents for the Applicants.

Printed for Her Majesty's Stationery Office, by the Courier Press, Leamington Spa, 1974
Published by The Patent Office, 25 Southampton Buildings, London, WC2A 1AY, from which copies may be obtained.

1352626 COMPLETE SPECIFICATION
1 SHEET *This drawing is a reproduction of the Original on a reduced scale*

Fig. 1

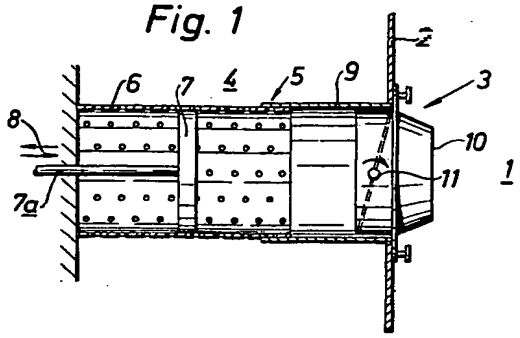

Fig. 2

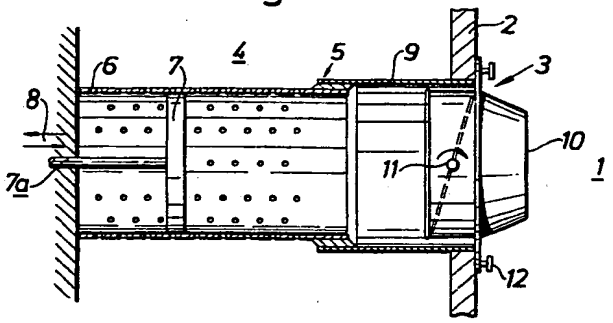

Fig. 3